

ABSTRACT

An optical switch is provided in which a cell comprised of photopolymer dispersed in a liquid crystal sandwiched between two transparent plates is first recorded with a grating utilizing two plane wave laser beams interacting at an angle. This grating is permanently established in the cell such that when the cell is illuminated the incoming beam is diffracted in accordance with the spatial frequency of the grating. When an electric signal is applied across the cell, the refractive index of the liquid crystal matches that of the photopolymer due to the molecular orientation of the liquid crystal and no diffraction occurs because the grating formed in the liquid crystal is temporarily erased or over written. The liquid crystal cell therefore becomes transparent with the application of the electrical signal. Switching occurs by whether or not the grating is present or not, which is in turn dependent upon whether or not there is an electrical signal applied across the cell.

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